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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,152	10/21/2003	Stephen L. Prucher	9539-000098	3907

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EXAMINER	
COMPTON, ERIC B	

ART UNIT	PAPER NUMBER
3726	

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/690,152	PRUCHER, STEPHEN L.	
	Examiner	Art Unit	
	Eric B. Compton	3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/22/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 9-19 and the newly added related claims 20-28 in the reply filed on March 2, 2005 is acknowledged. Applicant subsequently canceled claims 1-8.

Claim Objections

2. Claim 20 is objected to because of the following informalities: there should be an –and—between the last two method steps, also in line 12, there should be an –a— before "single stroke." Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Pat. 2,331,909 to Hensel et al ("Hensel").

Regarding claim 20, Hensel discloses a method a gear including an insert portion (10) and a perform portion (13), the method comprising:

providing a die assembly having an upper die (14), a lower die (11) and a mandrel (12), one of the upper die and the lower die defining a plurality of gear teeth (11'), the upper and lower dies forming a closed die that defines a die cavity, the mandrel being received into the die cavity and being configure to matingly engage at least a portion of an interior surface of the insert portion;

positioning the insert portion on the mandrel; and

positioning the perform portion with in the die cavity;

pressing the preform portion between the upper and lower lied in a pressing direction to form a plurality of gear teeth on the preform portion in a single stroke, the perform deforming both axially and radially during the single stroke such that the perform portion is fixedly engaged to the insert portion. *See* Page 2, Col. 2, lines 40-46.

Regarding claim 20, the preamble of the claim recites a method of assembling a differential assembly having a gear and a case, but the body of the claim merely claims a method for forming a gear to be used therein. If the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). Hensel discloses the same invention for forming a gear. Gears are known to be used in differential assemblies. Therefore, if not anticipated by Hensel, in the alternative, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to have used the gear formed by Hensel in a differential assembly, in order to efficiently bond a gear and internal core having different hardness requirements. *See* Page 2, Col. 2, lines 63-68.

5. Claims 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Pat. 3,535,762 to Taylor.

Regarding claim 20, Taylor discloses a method a gear including an insert portion (23) and a perform portion (22), the method comprising:

providing a die assembly having an upper die (26), a lower die (17) and a mandrel (24), one of the upper die and the lower die defining a plurality of gear teeth (56), the upper and lower dies forming a closed die that defines a die cavity, the mandrel being received into the die cavity and being configure to matingly engage at least a portion of an interior surface of the insert portion;

positioning the insert portion on the mandrel; and

positioning the perform portion with in the die cavity;

pressing the preform portion between the upper and lower lied in a pressing direction to form a plurality of gear teeth on the preform portion in a single stroke, the perform deforming both axially and radially during the single stroke such that the perform portion is fixedly engaged to the insert portion. *See* Cols. 2-3, lines 70-4. Furthermore, Taylor discloses, "Another variation consists in providing a gear with a steel toothed ring and a titanium web." Col. 3, lines 56-58. This arrives at the same structure as the gear claimed by Applicant.

Regarding claim 20, the preamble of the claim recites a method of assembling a differential assembly having a gear and a case, but the body of the claim merely claims a method for forming a gear to be used therein. If the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). Taylor discloses the same invention for forming a bevel gear. Bevel gears are known to be used in differential assemblies. Therefore, if not anticipated by Taylor, in the alternative, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the gear formed by Taylor in a differential assembly, in order to efficiently bond a gear and internal tubular shaft.

Regarding claim 21, the reference discloses the perform is heated. *See* Col. 2, lines 61-63.

6. Claim 20 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over SU 918605 to ABMAR.

ABMAR discloses an invention similar to Hensel above. *See* Derwent English Asbtract.

Regarding claim 20, the preamble of the claim recites a method of assembling a differential assembly having a gear and a case, but the body of the claim merely claims a method for forming a gear to be used therein. If the body of a claim fully and

intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999). ABMAR discloses the same invention for forming a gear. Gears are known to be used in differential assemblies. Therefore, if not anticipated by ABMAR, in the alternative, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the gear formed by ABMAR in a differential assembly, in order to efficiently bond a gear and internal tubular portion.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim Rejections - 35 USC § 103

8. Claims 9-11,13-17, and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor in view of U.S. Pat. 3,20,665 to Wells.

Taylor discloses the invention cited above. Furthermore, Taylor discloses, "Another variation consists in providing a gear with a steel toothed ring and a titanium

web." Col. 3, lines 56-58. This arrives at the same structure as the gear claimed by Applicant. Gears of this type are used in differential assemblies and one having ordinary skill in the art at the time the invention was made would have found it obvious to have done so, in order to efficiently bond a gear and internal core having different hardness requirements. *See* Page 2, Col. 2, lines 63-68. "In the event that a very high torque application is required, the shaft to which the gear is joined can be knurled, flattened or grooved prior to forging in order to provide a higher strength bond between the gear and the shaft." Col. 3, lines 59-63. However, the reference does not disclose providing the insert portions with a flange that extends outwardly in which engaged with the perform portion when the perform portion if forged.

Wells discloses a method of forming a composite gear. Well notes that in the prior art a problem with separation of the gear web and hub. *See* Col. 1, lines 23+. Therefore, Wells discloses providing the insert with flanges and/or buttons to resist displacement of the web and hub. *See* Fig. 3.

Regarding claims 9 and 25, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided the web of Taylor with a radially projecting flange (protrusions) in light of the teachings of Wells, in better resist displacement.

Regarding claims 10-11,13-15, and 26-28, these features are discloses by Wells. *See* Figure 3 (showing buttons on the flanges). When the second material is bonded to the insert, it will encompass the flanges and buttons to prevent axial and radial

displacement. The space between buttons can be considered a scallop in as much as Applicant contemplates.

Regarding claims 16-17, Taylor discloses inserting a pin (24) within the tubular insert to resist deformation during forging. *See* Col. 3, lines 1-5. As shown in Figure 1, both the insert and pin have complementary surfaces of engagement.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor/Wells in view of U.S. Pat. 6,315,841 to Fisher et al ("Fisher").

Taylor/Wells disclose the invention above, but does not explicitly disclose net-shaped teeth. Like, Applicant they discloses the teeth are formed in a single forging process, however, they are silent on the need (or no need) for additional machining of the gear teeth.

Fisher discloses a method for forming a bevel gear for differentials by forging. *See* Col. 1, lines 60-61. "The initial forging is precise enough so that no further machining of the teeth is required." Abstract. This is consistent with Applicant's definition, "Net-shaped teeth refers to the condition of teeth 108 as being completely formed and not requiring subsequent machine operations to properly form the geometry of the teeth." Specification, page 10, [0035].

Regarding claim 12, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the gear of Taylor/Wells to have net-shaped teeth, in light of the teachings of Fisher, so that no further machining is necessary.

10. Claims 18-19 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor and Wells in view of U.S. Pat. 3,962,772 to Haller.

Taylor discloses, "In the event that a very high torque application is required, the shaft to which the gear is joined can be knurled, flattened or grooved prior to forging in order to provide a higher strength bond between the gear and the shaft." Col. 3, lines 59-63. Wells disclose the features cited above. However, these references does not disclose providing the insert portion with a flange that extends outwardly in which engaged with the perform portion when the perform portion if forged.

Haller discloses a method for forming a gear and shaft composite, in which a gear is joined to a shaft while forging a billet of powder metal to form the gear. Like, Taylor, Haller discloses providing the shaft with knurls or splines to resist rotation. As shown in Figure 6, the splines extend away from a body portion of the shaft. Haller further discloses providing a brazing material between the two elements to compensate for expansion and enhance bonding. *See* Col. 1, lines 14-15.

Regarding claims 18-19, and 22-23, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the preform of Taylor and Wells by a powdered metallurgy process and provided a brazing material between the preform and insert, in light of the teachings of Haller, in order carry out forging at a lower temperature than from a solid billet. *See* Col. 6, lines 36-40. The brazing material therebetween is used to compensate for expansion and enhance bonging.

11. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor in view of JP 07-051789 to AISIN and/or U.S. Pat. 3,842,646 to Kuhn.

Taylor discloses the invention above, including that "the shafts may have any type of cross-sectional configuration." Col. 1, lines 64-65. In such a case, the mandrel would be configured to engage the tube to resist deformation during forging. *See* Col. 3, lines 1-5. Also, as shown in Figure 1, both the insert and pin have complementary surfaces of engagement.

However, the reference does not disclose the mandrel includes a splined portion matingly engages an internal splines formed on the insert portion.

AISIN discloses a method of forging a gear having an internal spline. Furthermore, Kuhn discloses a method of forming a gear having an internal spline. These reference clearly suggests that gear shaving internal splines are known presumably to engage a shaft having corresponding splines as well.

Regarding claim 24, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the gear of Taylor with a mandrel having a splined portion to engage internal splines formed on the insert portion, in light of the teachings of AISIN and/or Kuhn, in order to provide a gear having an internal splines to engage corresponding splines on a shaft.

Prior Art References

The prior art references listed on the enclosed PTO-892, but not used in a rejection of the claims, are cited for their teachings of forming composite bearings by forging.

AAPA, as found on pages 1-2 of the specification, discloses the prior art methods for manufacturing a differential assembly having a gear which is rotatable mounted in a case.

GB 1,265,137 is believed to be an equivalent of Taylor.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (571) 272-4527. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (571) 272-4690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric B. Compton
Primary Examiner
Art Unit 3726

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